

## Aluminum Capacitors Radial Style



### FEATURES

- Polarized aluminum electrolytic capacitor
- High ripple current
- High load life up to 10 000 h
- Temperature range up to 105 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

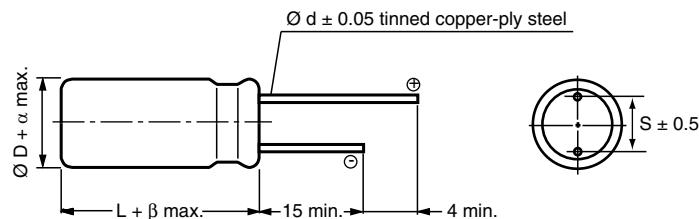
- For electronic lighting ballast
- Power supply

### QUICK REFERENCE DATA

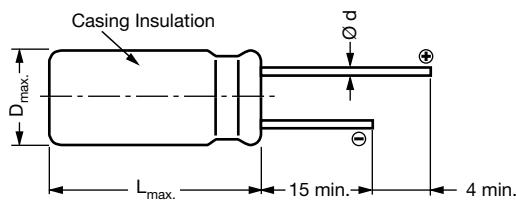
DESCRIPTION	UNIT	VALUE
Nominal case size (Ø D x L)	mm	10 x 12.5 to 18 x 31.5
Rated capacitance range $C_R$	$\mu\text{F}$	1.0 to 150
Capacitance tolerance	%	$\pm 20$
Rated voltage range	V	200 to 450
Category temperature range	°C	-25 to 105
Load life	h	10 000
Based on sectional specification		IEC 60384-4 / EN130300
Climatic category IEC 60068		25 / 105 / 56

### SELECTION CHART FOR $C_R$ , $U_R$ , AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)

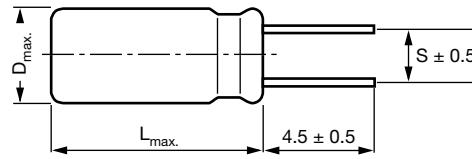
$C_R$ ( $\mu\text{F}$ )	RATED VOLTAGE (V)				
	200	250	350	400	450
1.0	→	→	→	10 x 12.5	-
2.2	→	→	→	10 x 12.5	10 x 16
3.3	→	→	10 x 12.5	→	10 x 16
4.7	→	→	→	10 x 16	10 x 20
6.8	→	10 x 12.5	→	10 x 16	10 x 20
10	10 x 16	→	→	10 x 20	12.5 x 20
22	10 x 20	→	12.5 x 20	12.5 x 25	16 x 25
33	→	12.5 x 20	16 x 20	16 x 25	18 x 25
47	12.5 x 20	12.5 x 25	16 x 25	18 x 25	18 x 31.5
68	12.5 x 25	16 x 25	18 x 25	-	-
100	16 x 25	18 x 25	-	-	-
150	18 x 25	-	-	-	-

**RADIAL STYLE: DIMENSIONS** in millimeters


Ø D	5	6.3	8	10	12.5	16	18	22	25
<b>S</b>	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
<b>Ø d</b>	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
<b>β</b>		1.5				2.0			
<b>α</b>			0.5					1.0	

**DIMENSIONS** in millimeters **AND AVAILABLE FORMS**


Ø D ≤ 18 long leads MALREKV00...


Ø D ≤ 18 shortened leads MALREKV05...
  
(S = 2 mm/2.5 mm/3.5 mm/5 mm/7.5 mm)

**GENERAL NOTE**

- For Minimum Package Quantity (MPQ) and Minimum Order Quantity (MOQ) please refer to our price list or contact customer service.
- For other packaging forms please refer to Vishay Roederstein General Information.

<b>ELECTRICAL DATA</b>	
<b>SYMBOL</b>	<b>DESCRIPTION</b>
$U_R$	Rated voltage
$C_R$	Rated capacitance at 120 Hz
$\tan \delta$	Max. dissipation factor at 120 Hz
$R_{ESR}$	Max. equivalent series resistance at 120 Hz
$I_R$	Rated alternating current (RMS) at 120 Hz and upper category temperature

**Note**

- Unless otherwise specified, all electrical values apply at  $T_{amb} = 20^\circ\text{C}$ ,  $P = 80 \text{ kPa}$  to  $120 \text{ kPa}$ ,  $RH = 45\%$  to  $75\%$ .

**ORDERING EXAMPLE**
**EKV 22  $\mu\text{F}$  / 450 V,  $\pm 20\%$ , size: 16 mm x 25 mm**

Leads: long

Ordering code: **MALREKV00JG222P00K**

Leads: short

Ordering code: **MALREKV05JG222P00K**

**ELECTRICAL DATA AND ORDERING INFORMATION**

<b>U<sub>R</sub> (V)</b>	<b>C<sub>R</sub> 120 Hz (<math>\mu</math>F)</b>	<b>DIMENSIONS Ø D x L (mm)</b>	<b>tan <math>\Delta</math> 120 Hz</b>	<b>R<sub>ESR</sub> 120 Hz (<math>\Omega</math>)</b>	<b>I<sub>R</sub> 100 kHz / 105 °C (mA)</b>	<b>WEIGHT (g)</b>	<b>CATALOG NUMBER (Long Leads)</b>
200	10	10 x 16	0.15	19.9	250	2.3	MALREKV00DD210S00K
	22	10 x 20	0.15	9.04	500	2.8	MALREKV00DE222S00K
	47	12.5 x 20	0.15	4.23	660	3.8	MALREKV00FE247S00K
	68	12.5 x 25	0.15	2.93	760	5.1	MALREKV00FG268S00K
	100	16 x 25	0.15	1.99	1120	7.1	MALREKV00JG310S00K
	150	18 x 25	0.15	1.33	1360	9.5	MALREKV00KG315S00K
250	6.8	10 x 12.5	0.15	29.3	120	1.9	MALREKV00DC168N00K
	33	12.5 x 20	0.15	6.03	600	3.8	MALREKV00FE233N00K
	47	12.5 x 25	0.15	4.23	720	5.1	MALREKV00FG247N00K
	68	16 x 25	0.15	2.93	920	7.1	MALREKV00JG268N00K
	100	18 x 25	0.15	1.99	1200	9.5	MALREKV00KG310N00K
350	3.3	10 x 12.5	0.20	80.4	100	1.9	MALREKV00DC133O00K
	22	12.5 x 20	0.20	12.1	350	3.8	MALREKV00FE222O00K
	33	16 x 20	0.20	8.04	500	6.3	MALREKV00JE233O00K
	47	16 x 25	0.20	5.64	660	7.1	MALREKV00JG247O00K
	68	18 x 25	0.20	3.90	840	9.5	MALREKV00KG268O00K
400	1.0	10 x 12.5	0.24	318	90	1.9	MALREKV00DC110X00K
	2.2	10 x 12.5	0.24	145	100	1.9	MALREKV00DC122X00K
	4.7	10 x 16	0.24	67.7	180	2.3	MALREKV00DD147X00K
	6.8	10 x 16	0.24	46.8	200	2.3	MALREKV00DD168X00K
	10	10 x 20	0.20	26.5	280	2.8	MALREKV00DE210X00K
	22	12.5 x 25	0.20	12.1	430	5.1	MALREKV00FG222X00K
	33	16 x 25	0.20	8.04	640	7.1	MALREKV00JG233X00K
	47	18 x 25	0.20	5.64	840	9.5	MALREKV00KG247X00K
450	2.2	10 x 16	0.24	145	120	2.3	MALREKV00DD122P00K
	3.3	10 x 16	0.24	96.5	140	2.3	MALREKV00DD133P00K
	4.7	10 x 20	0.24	67.7	180	2.8	MALREKV00DE147P00K
	6.8	10 x 20	0.24	46.8	200	2.8	MALREKV00DE168P00K
	10	12.5 x 20	0.20	26.5	320	3.8	MALREKV00FE210P00K
	22	16 x 25	0.20	12.1	560	7.1	MALREKV00JG222P00K
	33	18 x 25	0.20	8.04	700	9.5	MALREKV00KG233P00K
	47	18 x 31.5	0.20	5.64	880	12.0	MALREKV00KS247P00K

**LOW TEMPERATURE BEHAVIOUR (at 120 Hz)**

<b>IMPEDANCE RATIO Z (T2)/Z (T1)</b>	<b>RATED VOLTAGE (V)</b>				
	<b>200</b>	<b>250</b>	<b>350</b>	<b>400</b>	<b>450</b>
-25 °C / +20 °C	3	3	4	6	6

**ADDITIONAL ELECTRICAL DATA**

<b>PARAMETER</b>	<b>CONDITIONS</b>	<b>VALUE</b>
<b>Current</b>		
Leakage current (test conditions: U <sub>R</sub> , 20 °C)	After 5 min at U <sub>R</sub>	I <sub>L5</sub> ≤ 0.02 x C <sub>R</sub> x U <sub>R</sub> + 25 $\mu$ A
<b>Resistance</b>		
Equivalent series resistance (ESR)	Calculated from tan $\delta_{max}$	ESR = tan $\delta/2 \pi f C_R$

<b>MULTIPLIER OF RIPPLE CURRENT (<math>I_R</math>) AS A FUNCTION OF FREQUENCY</b>		
<b>FREQUENCY (Hz)</b>	<b><math>I_R</math> MULTIPLIER</b>	
	<b>1.0 <math>\mu</math>F ~ 4.7 <math>\mu</math>F</b>	<b>6.8 <math>\mu</math>F ~ 150 <math>\mu</math>F</b>
60	0.25	0.35
120	0.30	0.50
300	0.45	0.60
1000	0.60	0.80
10 000	0.80	0.90
$\geq 100 000$	1.00	1.00

<b>TEST PROCEDURES AND REQUIREMENTS</b>		
<b>TEST</b>	<b>PROCEDURE (quick reference)</b>	<b>REQUIREMENTS</b>
Load life	$T_{amb} = 105^{\circ}\text{C}$ $U_R$ and $I_R$ applied After 5000 h $\leq 6.8 \mu\text{F}$ After 10 000 h $\geq 10 \mu\text{F}$	$\Delta C/C: \pm 20\%$ of initial value $I_L \leq$ spec. limit $\tan \delta \leq 2 \times$ spec. limit
Shelf life	No voltage applied After 1000 h After test: $U_R$ to be applied for 30 min 24 h to 48 h before measurement	$\Delta C/C: \pm 20\%$ of initial value $I_L \leq$ spec. limit $\tan \delta \leq 2 \times$ spec. limit

Statements about product lifetime are based on calculations and internal testing. They should only be interpreted as estimations. Also due to external factors, the lifetime in the field application may deviate from the calculated lifetime. In general, nothing stated herein shall be construed as a guarantee of durability.

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